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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,544	01/14/2005	Shiro Sakai	08228/071001	9344

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OSHA LIANG L.L.P.
1221 MCKINNEY STREET
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HOUSTON, TX 77010

EXAMINER

QUINTO, KEVIN V

ART UNIT	PAPER NUMBER
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2826

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/29/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/521,544

Applicant(s)

SAKAI ET AL.

Examiner

Kevin Quinto

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 16 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6,7,9 and 10 is/are allowed.
- 6) ☐ Claim(s) 1,8 and 11-15 is/are rejected.
- 7) ☒ Claim(s) 2,3 and 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/25/06, 10/26/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Newly submitted claim 17 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the search for claim 17 is not inclusive of a search for the claimed semiconductor device in claims 1-16 since the claimed method in claim 17 details the growth of a buffer layer and an additional superlattice layer on the substrate as well as a specific temperature range for the growth of the quantum well structure.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 17 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Response to Arguments

2. Applicant's arguments with respect to claims 1-3, 8, and 11-15 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

3. The drawings are objected to because the word *electrode* is misspelled as "ELLECTRODE" in figure 1. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the

Art Unit: 2826

application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 8, 11, 12, 13, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by McIntosh et al. (USPN 5,851,905)
6. In reference to claim 1, McIntosh et al. (USPN 5,684,309, hereinafter referred to as the "McIntosh" reference) discloses a structure which meets the claim. Figures 3, 4, 8, and 9 of McIntosh each discloses a gallium nitride (GaN)-based compound semiconductor device having a GaN-based light emitting member (11d, 12c, 11e, 13c, 11f, 12b, 11b, 12a) wherein a buffer layer (11a) adjacent to the light emitting member (11d, 12c, 11e, 13c, 11f, 12b, 11b, 12a). The light emitting layer member (11d, 12c, 11e, 13c, 11f, 12b, 11b, 12a) comprises a multilayer quantum well layer structure including an InGaN well layer (12a, 12b, 12c) and an AlInGaN barrier layer (11d, 11e, 11f, 11b).
7. With regard to claim 8, the buffer layer (11a) adjacent to the light emitting layer member (11d, 12c, 11e, 13c, 11f, 12b, 11b, 12a) is an AlInGaN buffer layer (column 5, lines 3-5).
8. In reference to claim 11, the examiner notes the limitation regarding the formation temperature of the InGaN and AlInGaN layers. However this places claim 11 into the form of a **product-by-process claim**:

Note that a "product by process" claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Thorpe*, 227 USPQ 964, 966; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 2113.

Art Unit: 2826

Claim 11 does not patentably distinguish over the McIntosh reference regardless of the process used to form the InGaN and AlInGaN layers, because only the final product is relevant, and not the process of making such as forming at a temperature greater than 750°C.

9. In reference to claim 12, McIntosh discloses (column 8, lines 4-10) the use of a strained superlattice clad (SLS) clad layer (13).

10. With regard to claims 13 and 15, McIntosh makes it clear that the clad layer (13) can be an n-type SLS clad layer or a p-type SLS clad layer (column 8, lines 4-14).

11. Claims 1 and 11-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Sato et al. (United States Patent Application Publication No. US 2006/0175600 A1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

12. In reference to claim 1, Sato et al. (United States Patent Application Publication No. US 2006/0175600 A1, hereinafter referred to as the "Sato" reference) discloses a structure which meets the claim. Figure 1 of Sato discloses a gallium nitride (GaN)-based compound semiconductor device having a GaN-based light emitting member (24) wherein a buffer layer (22) adjacent to the light emitting member (24). The light emitting

Art Unit: 2826

layer member (24) comprises a multilayer quantum well layer structure including an InGaN well layer and an AlInGaN barrier layer (p. 5, paragraph 43).

13. In reference to claim 11, the examiner notes the limitation regarding the formation temperature of the InGaN and AlInGaN layers. However this places claim 11 into the form of a **product-by-process claim**:

Note that a "product by process" claim is directed to the product per se, no matter how actually made, *In re Hira*, 190 USPQ 15 at 17 (footnote 3). See also *In re Thorpe*, 227 USPQ 964, 966; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 2113.

Claim 11 does not patentably distinguish over the Sato reference regardless of the process used to form the InGaN and AlInGaN layers, because only the final product is relevant, and not the process of making such as forming at a temperature greater than 750°C.

14. In reference to claim 12, Sato discloses (p. 3, paragraph 31) the use of a strained superlattice clad (SLS) clad layer (20, 26).

15. With regard to claims 13 and 15, Sato makes it clear that the clad layer (20, 26) can be an n-type SLS clad layer or a p-type SLS clad layer (p. 3, paragraphs 28 and 30).

16. In reference to claim 14, Sato discloses the use of an alternately layered n-GaN and n-AlGaIn (p. 3, paragraph 28).

17. Claim 4 is rejected under 35 U.S.C. 102(e) as being anticipated by Sato et al. (United States Patent Application Publication No. US 2006/0175600 A1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

18. In reference to claim 4, Sato (United States Patent Application Publication No. US 2006/0175600 A1) discloses a structure which meets the claim. Sato discloses a gallium nitride (GaN)-based compound semiconductor device comprising: a GaN-based light emitting member which comprises a multilayer quantum well including an InGaN well layer and an AlInGaN barrier layer (p. 5, paragraph 43). The thickness of the InGaN well layer is 1 nm or greater and 2 nm or smaller (p. 5, paragraph 43).

Allowable Subject Matter

19. Claims 6, 7, 9, and 10 are allowed.

20. Claims 2, 3, and 5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

21. The following is a statement of reasons for the indication of allowable subject matter: the examiner is unaware of any prior art which suggests or renders obvious a gallium nitride based light emitting semiconductor device which has multilayer quantum

Art Unit: 2826

well structure having an InGaN well layer, an AlInGaN barrier layer with the explicit indium compositional ratio as required by the applicant's invention.

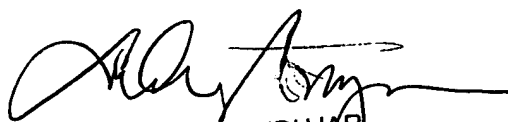
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Quinto whose telephone number is (571) 272-1920. The examiner can normally be reached on M-F 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KVQ


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PRIMARY EXAMINER